



Intelligent Fairway Smoothing Path for Autonomous Vessels

Jorma Timonen, e-Navigation Underway 2017

31.1.2017

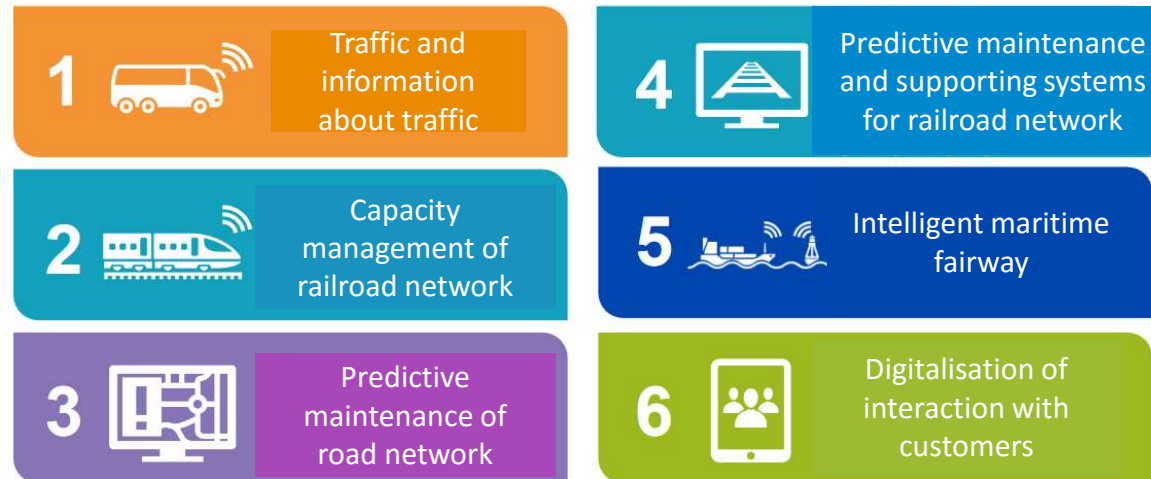


Topics

- Intelligent fairway project
- Products and services
- Co-operation
- Autonomous vessels



FTA's Digitalisation Project 2016 - 2018



We don't want to wait for the future
– we want to create it!



Sub-project 5: Intelligent fairway

- Finnish Transport Agency's project which aims to develop new services for mariners and other actors of the maritime industry
- Phase I
 - Description of products
 - Methods to collect data
 - Description of interfaces
- Phase II
 - Testbed(s)
 - To test and validate tools and services developed in Phase I
 - For example data transmission
 - Sea – shore – sea
 - Currently we do not know exact results of the project – will be defined based on upcoming ideas and discussion – *what the user needs?*



Goals of the Intelligent Fairway

N2000 vertical datum

/ Jyrki Mononen

Define and plan the transition to use of N2000 vertical datum in hydrography and hydrographic products in Finland.

Not to be included to Phase II

Dynamic Under Keel Management

/ Stefan Engström

Define product specification for under keel clearance management. IHO's project, FTA participates and follows work of the group.

Maritime Safety Information

/ Jouni Patrakka

Define and implement standard procedures for use of the AIS ATON messages.

Bathymetric Models

/ Stefan Engström

Define product specifications of the bathymetric models and simulation systems to validate them. Develop maintenance of the bathymetric models produced by other bodies (e.g. harbour authorities)

Water level and weather

/ Jouni Patrakka

Develop collection and distribution of water level and weather data using AIS.

Phase II: Test beds

/ Jorma Timonen

Testbed for products and processes defined in Phase I.

Digital Saimaa Channel

/ Seppo H. Mäkinen

Collect digital information for models of Saimaa Channel both on dry land and below the surface.

Not to be included to Phase II

Remote Control of Nav aids

/ Sami Lasma

Develop mechanisms and processes for remote control of nav aids.

24.1.2017

Mononen
Jorma Timonen

5

5



Vision of the Intelligent Fairway Project

- In the project FTA will **develop** and **test** information products for mariners to be used in navigation keeping both safety and efficiency in mind.
- Products will be tested in real use – first in simulators and then on board
- New bathymetric products together with real-time water level information will improve transport efficiency
- Better situational awareness about weather and water level will improve safety of navigation



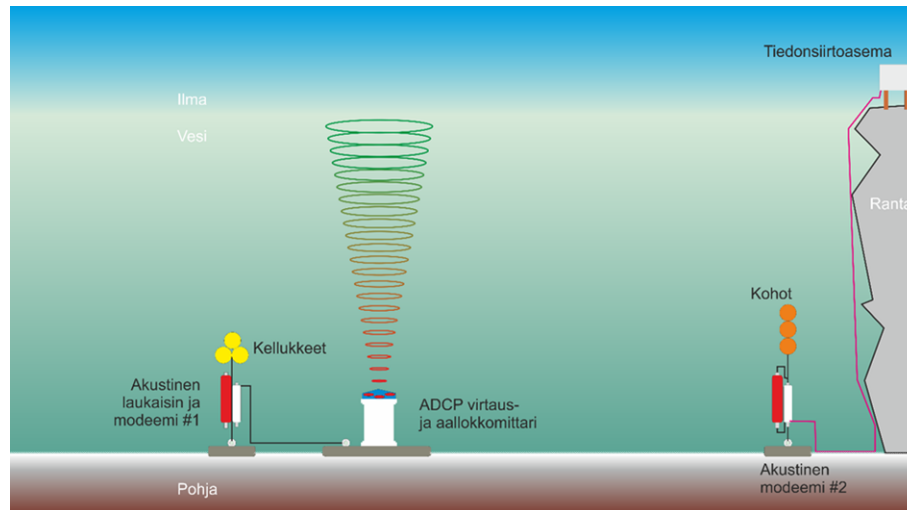
Hand in hand – safety and efficiency



Water level and wave height

Production of sea level data and other weather data Q1/2017, distribution Q2/ 2017

- FMI produces forecasts for water level (under construction) and confirmation of forecasts in real time. Information will be distributed as AIS messages through national AIS network and AIS GW -service. In the future also other weather data will be distributed using same methods.
- A testbed installation (by Luode Consulting) will produce other data form fairway areas using ADCP. Data to be produced; e.g. currents, ice, wave height and direction of waves.



31.1.2017 Jorma Timonen



Measuring wave height

- Lanterns produced by Estonian company Cybernetica are equipped to measure inclination of the buoy.
- Analysis of 5 buoys' measurements has been made and compared to FMI's wave height and wind records in 2013-15
- Improved lantern has been produced; new model is more robust to resist forces of ice conditions
- 8 new buoys has been installed and new test phase started. Collected data will be analyzed when there is enough data available.

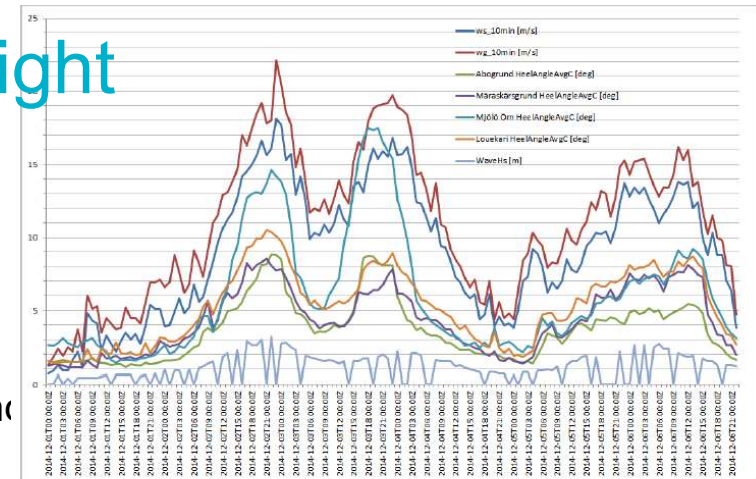
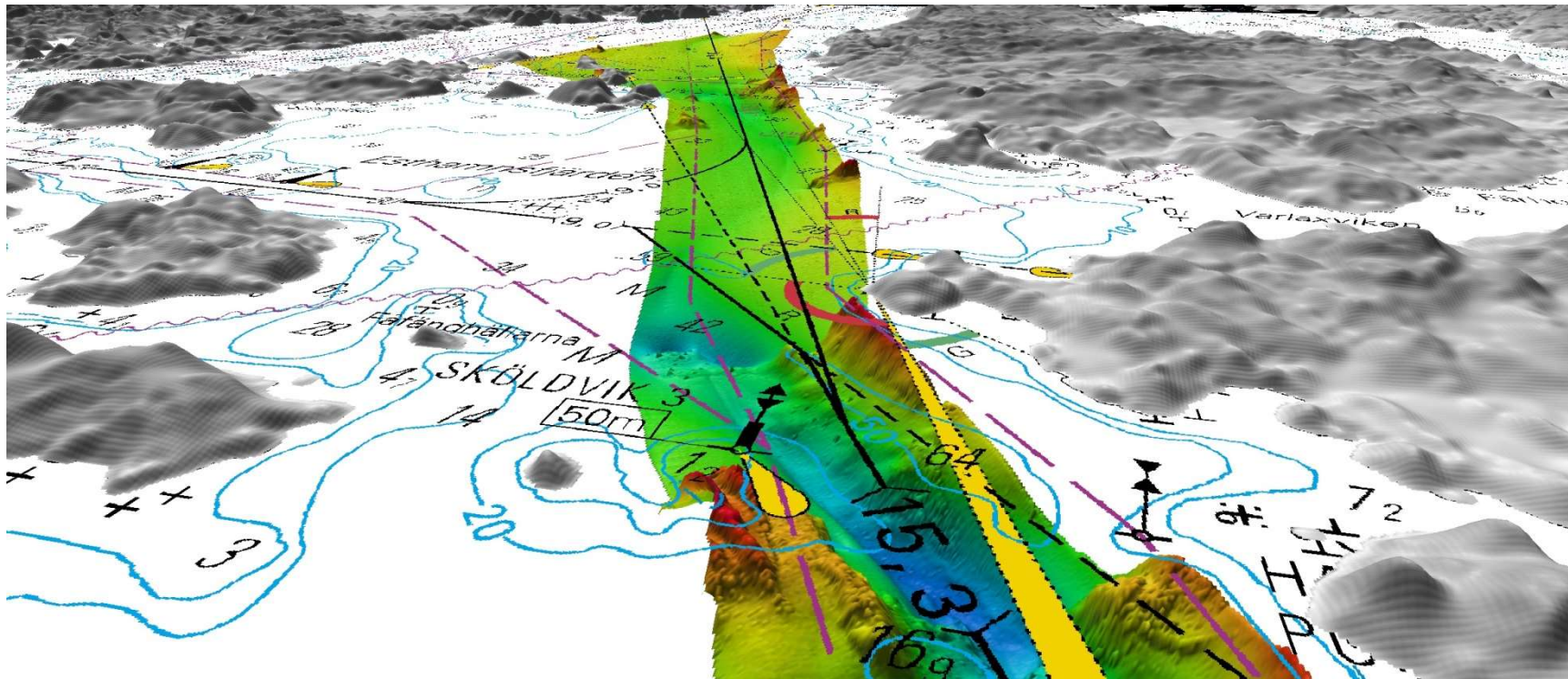


Figure 52. Wind and gust speeds and significant wave height of a week in December 2014 showing deepest heeling, obtained from the FMI station 101003 - Helsinki Lighthouse, time-aligned with the averaged heel angles of four buoy stations near Helsinki. Vertical axis is unit-less, showing values of all relevant parameters.





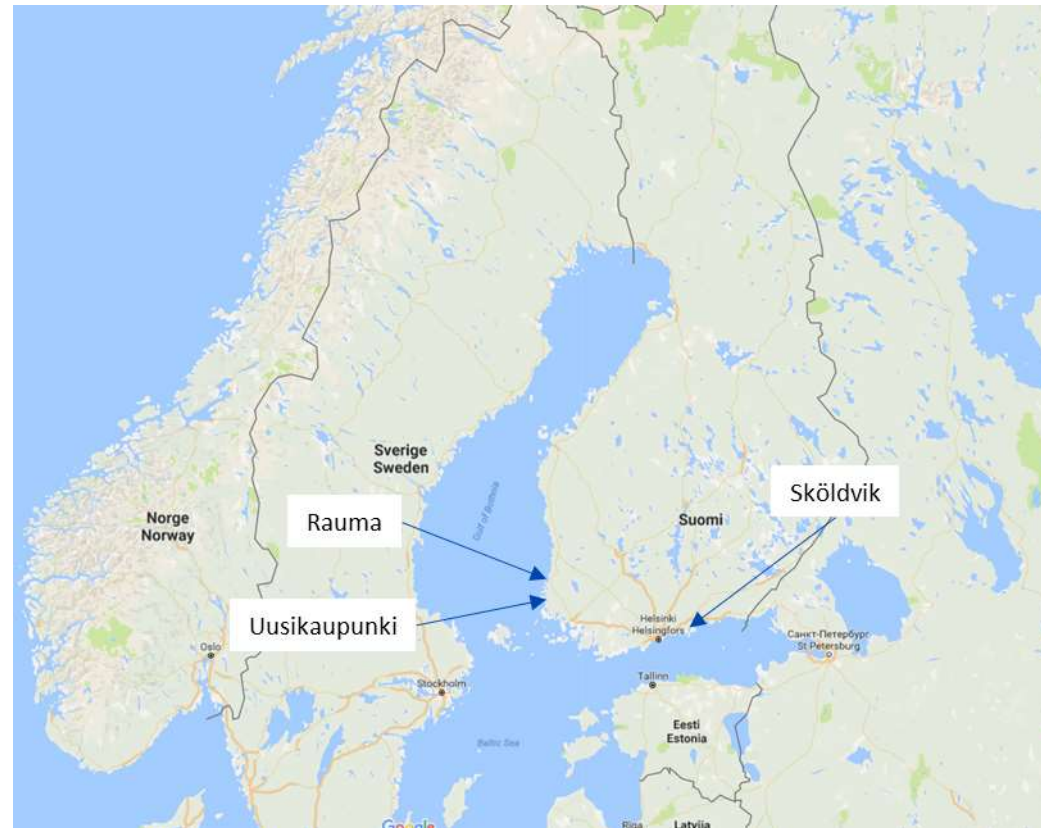
Precise bathymetric model of the fairway





Test areas

- Testbeds in three geographical areas
 - Porvoo Sköldvik – Gulf of Finland
 - Uusikaupunki – West coast
 - Rauma – West coast
- All three ports are interested in development of new tools





Consortium of Interested Bodies

- January 24th was the first discussion forum for all interested bodies
 - There were 40+ participants including
 - Other public sector organisations
 - Private sector
 - Third sector
 - Presentations and news about digitalisation and networking in development of new services
- Idea of network of interested parties (consortium) was raised and will be created
 - Lead by FTA
 - All interested organisations are welcome
 - Free of charge
 - Meetings, workshops, networking, new ideas: together we are stronger



aurora

THE ARCTIC INTELLIGENT
TRANSPORT TEST
ECOSYSTEM

1. Arctic testing for intelligent transport automation

Technology test sites in real winter conditions with broad selection of services

2. Digital transport infrastructure and connected cars

Accurate mapping of road infrastructure and signage enabling connected driving and analytics for traffic management

3. Intelligent infrastructure asset management

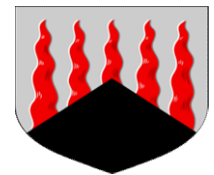
Data collection and refined traffic management and maintenance processes in the era of automation

4. Mobility as a Service

Flexible and affordable mobility services for tourists and locals without car dependency



Enontekiö



Kolari



Muonio



Paliskuntain yhdistys





AURORA - Arctic challenge 2017-2018

- Call for intelligent infrastructure and road vehicle automation solutions and their performance and impacts in Arctic conditions
- Bases on [Road transport automation Road map and action plan 2016 – 2020](#)
- 5 categories of research questions: physical infrastructure, communications, location data and positioning, impact assessment and data
- Technical performance of the solutions is to be verified with field trials using automated vehicles in the Aurora corridor (E8)
- Call budget around 1 – 2 million euros
- Call to be published in January 2017



Intelligent Fairway Project: Funding

- Budget for testbed phase is 1,2 M€ for 2017 and 2018
- FTA can provide some funding and partners should also use their own R&D budget
- Application for funding, ref. Aurora?
 - Maritime Challenge?

DIMECC

Ecosystem for Autonomous Ships

Finland aims to operate world's first autonomous ship system in 2025



Image © Rolls-Royce

 **MERITEOLLISUUS**
Finnish Marine Industries

ABB

 **CARGOTEC**
HIBB - KALMAR - MACGREGOR


ERICSSON

 **MEYER TURKU**
SHIPYARD 1387

 **Rolls-Royce**

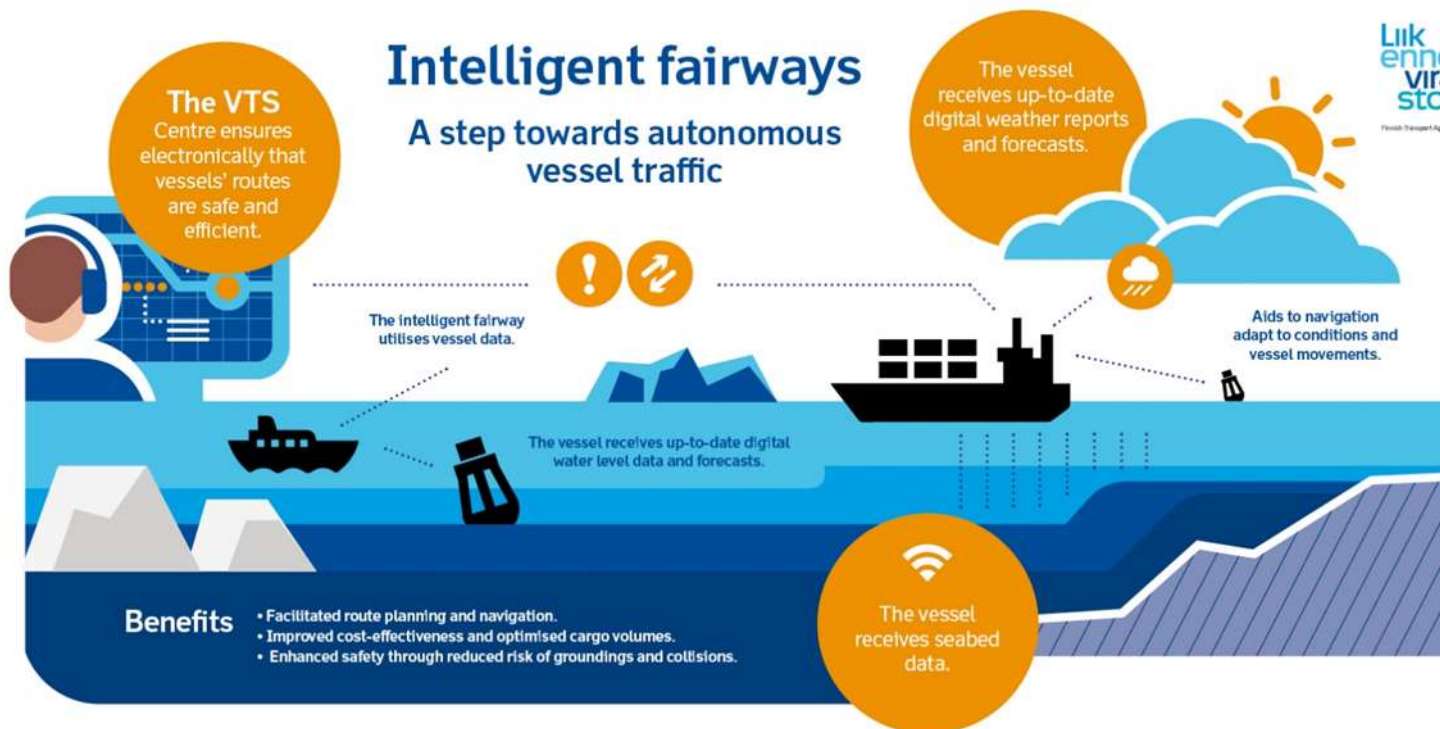
tieto


WÄRTSILÄ

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Intelligent Fairway and Autonomous Maritime Traffic





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